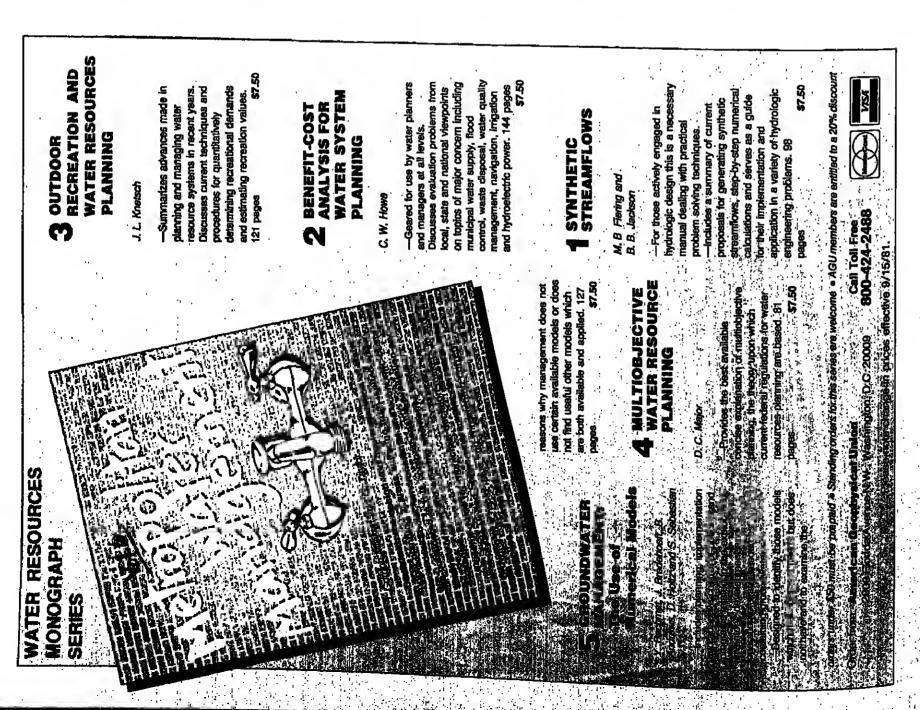
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SEPTEMBER 15, 1981



Editorial

An Atmospheric Sciences Section

il has been proposed that the name of the Meleorology Section be changed to 'Almospheric Sciencee Section.' Such a change would emphasize the Interdisciplinery neture of the scientific interests pursued by AGU members. It would encourage etmospheric chemiste and atmospheric electriciens to effillete with the eection.

There ie elso coneiderable interest in combining this secton with certain portions of SPR: Aeronomy. Some aeronomers have ehown infereet in joining Atmospheric Sciencea and some want to etay in SPR.

Unfortunetely, there are few convenient ways to explore the opinions of the entire membership of both eectione regarding the proposed change other than this editorial in Eos. We urge you to voice your euggestione or comments by October 1981 to your eaction president or presidentelect. is the name change appropriate? is such e merger with parts of SPR: Aeronomy reasonable? If this is done how would one determine what parts of Aeronomy should kin Almospheric Sciences end whet parts ehould stav in

Waalso plan to heve businese meetings of the Meteorotogy Section and the SPR Section at the Fall Meeting of the AGU to coneider thie matter further.

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less expressed in this publication ere those of the authors only and do not reflect official positions of the American Geophysical Union urless expressly stated.

Cover, Beam plasma discharge: (left) A 25 mA, 1.8 keV electron beam injected at 50° pitch engle in a magnetic field of 1.5 gauss and a neutral gas pressure of $\theta \times 10^{-6}$ for (right) All conditions same except on the same except in the same exc same except current increased to 60 mA. What was formarly indi-vidual particle. vidual particle Larmor motion (laft) hee ignited into a etrong lumi-nous lonization column filling tha Larmor epiral (right). Collective asson of the beam and the column filling the Larmor epiral (right). action of the beam and its salf-made pleame in producing inlense electric waves which accelarate electrons and lonize the nautral gas is responsible. gas is responsible. (Photo by Hugh Andareon and Jerry Jost at the MASA Johnson Space Centar Vecuum Test Facility; camera axposure about 1 min at 1:2.8 using ASA 3000 tilm. Sea meeting report, 98.678, for more information.)

A Former Editor Views the Editorial Process

R. Allan Freeze*

Department of Geological Sciences University of British Columbia Vancouver, B.C., Canede

introduction

If was all he AGU Fall Maeting in San Francisco in December 1976, ahortly after my appointment as coeditor of Water Resources Research that I tirst began to realize tha strong emotional lies that exist between a scientific community end its journals. Feelings run high, regardless of whether they come from reedere, contributors, reviewers, ective aclentists, or scientific administrators. Opintons are often poeltive, sometimes negative, usually a mixture of the two; but regardless of their lenor they are dalivered to the editor, in peraon, usually fortiaalmo. From that day until thia, conference life has never been dull. When I maat a colfeague in the halla there is never a loss for words, no need to aearch for a topic of mutuel interest; WRR is always there at the ready.

Over these years I have listened to suggestions, compitments, opinions, propoeals, questions, complaints, secrets, and curses. But when etripped of the apecifics, most of my colleagues were asking e variant of one of the following seven queellons:

- Why dld it take so long for my paper to oppear? 2. How could you possibly have rejected my recent submission (especially in light of the anthusiastic support of reviewer D and the obvious incompetence of reviewers A,
- 3. How could you possibly have accepted the paper by Smith and Jones (espacially after the scathing raviaw I sent
- What is the pottcy of WAR toward multipla-part pa-
- 5. What is AGU's page charge policy with respact to
- 6. Why does WRR publish so many theoretical papers and so few applied papers?

7. Is the review process raally naedad at all? I am writing this article in the hope that it will provide some answers to these questions and that it may help to clarify the murky workings of the editorial process. Of course, es with all clarifications, there is e hitch. My term ae edilor expired on January 1, 1981, end philosophies of editing ere notoriously personal. My successor as coedilor for the physical eclences side of WRR ta Sieve Burges of the Department of Civil Engineering at the University of Weshington in Seettle. He has reed this article and on the reviewer appreisal form, he recommended 'publication with minor revielon.' This response suggests aither that our personal philosophies ere not all thet far epart or thet this is

the hydrologic equivelent of the Nixon pardon.
The editorial board of Water Resources Research conelsts of two coedliore and a slate of essociete editors. During my tenure, I was fortunate to work first with Dava Major and then with Jerry Cohon as coeditor for the social eciences aide of WRA. At verious timea, 25 diffarent scientists (see box) served as asacciele editore, and all ware Involved in both the day-to-day processing of manuscripts and the long-term development of policy. Thay deserve a greaf deal of credif for the success of the journal.

*Coadtor, Water Resources Research, 1977--1980

Associate Editors, WRR, 1977-80

John J. Boland, Johns Hopkins University E. Downey Brill, Jr., University of Illinole et Champalgn-Urbana

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William E. Sopper, Penneylvanie Stete Univeretty Kelih O. Slolzenbech, Meesachusette Instituta of

Eric Wood, Princoton University The hours they put in on behelf of the journel are long:

the thenks they get is embarrassingly meager.

The WRR Editorial Process

The WRR aditorial process is outlined in Figure 1. Authors submit their pepers to one of the two coeditors, who In Jurn select an associate editor to process the paper. Associala editors are responsible for salacting raviawars and onsuring that reviews are complated within a reasonable Ilme. Aflor analyzing the reviews, the associate editor may return the papar diractly to the aditor, aither for rejection or because no revisions are needed, or no may return it to the author for revision. Authors are instructed to sand their revised manuscript back to the associate aditor so that he can check to see that the requosted revisions have been carried out. If so, the manuscript comes back to the adilor and thence to AGU for publication. One copy of the typescript and the glossy prints of the figures are kepf on file at the editor's office during the entire editorial process. Final notification of acceptance or rajection comes to the author from the editor's office. In rare instances, the editor may choose to reject a paper without sanding it through the full review process.

Figure 1 also shows the range of alapsed times that one might expact for each step of the editorial process. The lolal processing time ie controlled in lerge part by the time lakan by reviewers during the review staga and by authors during the revision stage. With mailing firmss now running between 1/2 and 11/2 waaks, avan if reviewers and authora respond quickly, total processing time takes 21/2 months. A more usual period would be 5 months; and if reviewars, authors, and the maifs ere all slow, the editorial process can take 8 months. Statistics kept by the AGU Publications DIvialon contirm this analysis. In 1979, for exemple, 10% of the eubmissions were sent to AGU within 14 weeks and 50% within 28 weeks. There were 10% that fook longer

An Invitation to Contribute Papers of Interest to

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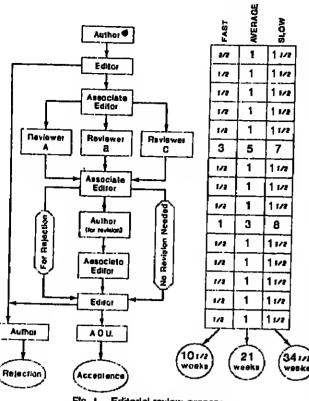
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aber of accepted papers will be limited. Rigid refereeing standards will be adhered to to insure the publication of only superior papers.



Ftg. t. Editoriel review process.

than t yoor. An analysis by the editor's office of those monuscripts that look longer than 8 menths to process revealed thet 75% of the coses resulted from lengthy author revision periods. Of the remaining 25%, about hot were the reauti of unevoldably lengthy or multiple interactions between enther and associete editor on difficult or marginal pepers, and ebout half can be chalked up to inefficiency on the part of the editortal board.

Once the papers go to AGU there is a lurther processing time of 5 to 8 months for copy editing and galley-proof preparation and review. The AGU Publications Division recently committed itself to Improving Ita average performance from the 25–27-wask everage for 1979–81 to 20 wooks for 1981–82.

In summory, authors who do not take undue tima with revisions should anticipate thei that lotal time from submission to publication will run between 8 and 13 months. As this statement indicates, total proceeding time tollows a statistical distribution with a fairly large etanderd deviation. Undoubtedly, most authore realize this, but the reelization doesn't lessen the fruetration of those authors whose papers seem to be progressing at e rate designed solely to satisfy the laws of aletielics in the 95% tall.

It is clear that processing times could be reduced by a simplification of the echeme outlined in Figure 1. As Alex Oesster has pointed out for the blue JGR [Desslar, 1972], the editor could take on e greater rote in the selection of reviewers or in meking decisions without the aid of reviewers. This approach would minimize the role of the associete editora. In eiteld as diverse es water resources has become, I personally doubt whether an editor operating without heavy dependence on associate editors could properly maintain the quality of the journal. I think that the current system is a good one end that processing times are best minimized by administrative vigilance from the editor's office end constant pressure on authors and referees to review and revise

Reviews, Rejection, end Type II Errora

Garnesmanship, ee Stephen Potter hee made claar, pervades all of life. It should come es no surprise then to lind that the reviewing proceee cen be viewed as a game. As described by *Chambers* and *Herzberg* [1968]:

Pley opens with submission of the paper by the euthor. At this point the editor of the journal intervenes to select the opposing player(s). The next move is by the referee. Without loss of generality, we cell this move the refusel. This mey be followed by a further submission, a further refusel, and so on, until one or [the] other player concedes defeet.

ino euthor and for the referoe. Among those listed for the euthor is the 'Anticipation tactic:'

Hero the euthor stlempts to disarm criticism either (e) by insorting liattering referencee to the work of all the more likely potential referees, or (b) by writing pepers jointly with oil the experts in the listd, thus making it impossible to lind e referee.

Among the tactics for the retsrea is the 'unsultable-for publication-in-this-journal tactic:'

This tectic ie elso known ea the 'ehirking-of-duty tectic.' As a last resort the referee seye that the paper le unsuitable for publication in the journel in question and makes a suggestion that it be submitted to enother journel, which is suitably insulting to the author. This then ends the game between these two particular opponents. The referee then hopes that the suitably insulting journel does not eak him to referee the paper.

Apart from the obvious pleasures of gemesmenship, the purpose of the reviewing process le presumebly twoloid: (1) to provide euthore with information to improve their presentation, and (2) to provide editors with information to eld

them in their dactsion to eccept or raject. Reviews may be positive or nagetive, and they may be useful or usalsee. A positive review recommands acceptance; a negetive review recommende rajection. A useful raview is one that provides helpful euggestions to the author in support of a positive racommandation or one that provides well-articulated documentation in eupport of a negetive racommendation; e usaleee review is one that racommends ecceptance or, worsa yel, rajection, but provides no specific reesons.

If two or more reviews are received by the associate adlor on a given paper, a unanimous recommendation for rejection or for acceptance, with or without revision, is usually accepted. In the case of mixed reviews, it has been WRR policy not to go out for a second round of reviews. A decision is made by the aditorial board by implicitly assigning weights to the conflicting reviews and by exploiting the ex-

... some papers ... are so original or so provocative that they deserve publication on these grounds alone....

pertise of the board liself. Reviewers mey vary widely in their suitability to the assignad review taek. Thay may vary in technical competence, in scientific experience, in experience in the reviewing process, and in their known predifactions for Isvorable or unlavorable reeponee to the work of others. Reviewere must recognize that their reviews are recommendations only; the decision reats in the hands of the editore. Reviewers can be essured that all negetive reviews are peesed on to the euthors, even if the negative recommendation has not been accepted. Once e decision has been reached to allow en author to revise his peper toward eventual publication, however, reviewers and editors allke must realize that it is the euthor's paper. It the author is going to he ve to lie in the bed, he ought to be allowed to make it.

Editore, like stetisticisms, ere subject to type I and type II errors. We occesionally raject papers we ought to publish; we occesionally publish pepere we ought to raject. An editor's goal is simply to raduce the number of such occurrences to delta (which mathematics students will recell is always amalier than epsiton, which is itself very smell). An unworthy acceptence is thought by most editors to be a much lesser evil than an unwerranted rajection. It is hoped that peer response will identify the incorrectly published paper in due course. The untairly rejected material, on the other hand, may never appear, to the detriment of the author and the scientilic community; or worse yet (in the eyes of the editor), it may be accelemed efter publication by the competition, to the detriment of the journel.

When e paper eppears in WRR, no matter whet you may think of it, it presumebly received reviewer support from some querter. The only exception is when the editor invokes what I liks to cell the Langbein doctrine. As Walter Langbein explained to me during his tenure as the first editor of WRR, there are some papers that ere so original or so provocative that they deserve publication on those grounds slone, perhaps without raview, or perhaps deaplie negative reviews. During my tunure, I invoked the Lengbein doctrine on very few occasione and have not yet regretted any of those decialons.

Ouring the period 1977–1980, the rejection rate for WRR renged between 25% and 30% on tirst submissions. The effective rete te somewhat lower in that material originally rejected sometimes reeppeare in a totally ravised resubmission that provee acceptable. The WRR rejection rate is in keeping with other AGU publications, with other earth science publications, end, indeed, acroes the broader spectrum of acientific journals in general. Much higher rejection retes are common in the humanities but not in the sciences.

Multiple-Part Papera

Ouring my editorial tenure, I generally tried to avoid hardand-laet policy rulee, preferring inelead e more flexible approach that sllowed leeway for decisions on an individual basis. In this spirit I did not have a fixed policy about multiple-part pepsre. Pepare thet were submitted by authors in multiple perts were usually reviewed in that form. In cases where reviewere or editore felt that the reedere would be better eerved by a single peper, authors were requested or instructed to cerry out a major revision to that end. I did not have then, nor do I heve now, sny parsonal objection, elther es an editor or e reeder, part papers. I believe there ere many scientilic studies that sre beet reported in thie lorm. I believe that decisions about lormst should be left in the author's hende, unless reviewere identify the formet as a weakness in the presentation. Editoriel decisions on multiple-part pepers ought to rest entirely on the lechnical merits. Journal editors heve no obligstion to take into account how institutions treat multiplepart papers in their publish-or-perish seasssment of individusis. On the one hand, lhen, authora should be allowed (eithough perhaps not encouraged) to separeta their work into perts when there is good resson to do so; on the other hand, the editorial board must remain vigilant to discourage

I have seen no evidencs to suggest that euthors who submit their work to WRR ere familiar with the LPU strategy oullined by Broad [1981] In a recent issue of Science. An LPU is the 'least publishable unit' of an ongoing research project, and Broad holds that the trickling forth of LPU's into the literature is in large part responsible for the massive explosion in journels, pepers, end journel pegss in recent years.

Page Charges

Many authors fall to submit good work to WRR because they seel that they would be unable to pay the page.

Forum

Re: Magnetic Monopoles

It might be of some interest to note that following Vestine's suggestion, we had incorporated the magnetic monopole (go) as a variable in our geomagnetic field modeling programs several years ago and sometimes turn it on (allow it to assume a nonzero value) to help less our analyses. As we reported at the Bergen meeting in 1966, its value tends to hover about the level which we guess to be the securecy of the coefficients desired and has been as low as 1 nT from the models run using only POGO deta.

We have also tested using the recent Megset data and find go now about 3 nT for the aerth. Ignoring the real possibility that we are only determining a noise figure, is there a chance that the sum of all monopoles in the earth could add up to an observable go?

Joseph C. Cain

Branch of Electromegnetism

and Geomegnetism

U.S. Geological Survey

Denver, Colo

charges. This is a misteke; AGU recognizes that all scientiets do not enjoy sufficient support to pay page charges, and it is AGU policy that ell accepted papers are published in WRR, regerdless of whether the pege charges are honored. In this sense, WRR pege cherges are voluntery. Having said this, I must empheaize that the financial health of WRR is dependent on the peyment of page charges by those with sufficient research support. It is an abrogetion

The editorial process is carried out independently of the page charge decision. . . .

of eclentific responsibility if evelleble grent funds are divered to other purposes while page charges go unpeld. Correspondence about pege charges takes place directly

between the author and AGU. The editorial process is carried out independently of the page cherge decision; in lad, without knowledge of it.

If the percentage of unpeid peges in WRR were to become very large, AGU receives the right to offer priority publication to papers on which the page charges have been paid end to delay those on which the page charges have not been paid. During my 4 yeers as editor, however, there wes no delay et any time in the publication schedule of any paper, end there is currently no such delay.

Theory end Prectice

Apperently the hydrologic community carrise two strong perceptions about WRR. First, it is perceived as the leading journal in the field; and second, it is thought to lavor theoretical pepers at the expense of applied papers. As addict, was elwaye pleased with the tirst view, less so with the second.

As noted on the inside front cover of the journal, the edit tors of WRR invite original contributions in hydrology." Clearly, 'original contributions' may come in the form of improvements to scientific theory and methodology, or they mey come in the form of edvancements to engineering practice and policy analysis. I have occesionally noticed that authore who publish the theoretical derivellon of a new methodology in WRR will publish its initial epplication in an other journal. This mey be done simply to gain a widsr resderable; but if it is done with the thought that WRR would not be interested in the practical paper, than that perception is incorrect. The journel is very interested in publishing papere that emphasize field applications, engineering design, inatrument development, or policy analysis The fact that there ere relatively few such papers reliects upon lower submission ratee, not upon higher rejection; relas. It is not necessary that e paper have a strong main melicel component. The editors would like to ess more par pers that report the results of cereful field measurement progrems, especially ones that leed to an original or creative hydrologic meesage.

The type of epplied or precticel paper that is not likely to be accepted to one that utilizee e well-known technique in a field epplication that has no perticular uniqueness. (Of course, theoretical pepere of this type are not likely to be accepted either). This is not to say that papers of this type are not useful to the water resources community. This papers of such pepere, which is to build up documentation of engineering precedent and case histories of policy analysts, is a veild one, but WRR has chosen not be the outlet for this type of work.

One last comment: while the perception of WRR as a theoretical journel has some besis in fact, the resity is not nearly as cleer as the perception. Any resder who thurbes through the lesues of the pest few yeers, will find a healing parcentage of papera that emphasize field measurements and practical applications.

Sociology of the Reviewing Process

The most fundamental question that cen be asked about eil this le: 'Is the review process really necessary?' A 1993' tive response would probably be treading on the rather this line that exists between the review process and censorally, and on the question of the

and on the question of bles.

Surprisingly perhaps, there has been a good deal of so cloogical study of these questions. Ever since Dersk de Sells Price first (timed the methods of eclence on science liaelf [Price, 1964], there have been numerous sistisfical.

studies designed to meesure the stitclency of the review process in terms of its elsted gosle and to uncover evidence of bles. Most of the studies have used the physics fleature se their statistical sample, but I expect that their conclusions can be carried over to the serth sciences.

With regard to the bles question, Gordon [1979] discovered statistically eigniticant refationships between referees evaluations and the national end that itutional effiliations of the referee-author pairings. For example, reviewers from major universities were harder on authors from minor uni-

... it is every editor's prerogative to judge for himself the balance point he wishes to occupy on the tightrope. . . .

versities than on those from major universities. In this case, of course, there may be a deterministic as well as a stochastic component to the finding. Less easily dismissed is his evidence that British referees provided more fevorable reviewe of British authors than of North American authors, and vice versa.

Zuckerman and Merton [1971] report more encouraging resulte with raspect to blas. They investigated the effect of the relative ranks of euthor end referee on the referee's dedision. The first rank was e small group of award-winning physicists; the second rank was a larger group, whose biographies were widely evallable in scientific who'e-who lietins and the third rank was the very lerge group thet didn't quelify for alther of the first two ranke. Six possible forms of bias were investigated. If authors outrank reteraes, either status deference or status envy could be important. Il referses outrank authors, blas might teke the form of etatue petronage or sistus aubordination. It author and relarge come from the same rank, the reteree could feel status competiion or etatus solidarity. The stetistical studies did not lead to the acceptance of any of these elx hypothases. Zuckerman and Merton did uncover a correlation between renk end ecceptence rets but not between age end acceptence rate. In fact, 'the youngest group of third-renk physicists had as high en ecceptence rets as the oldast group of high-rank physiciets whose work, we suppose is no longer es good as it once wes.' Zuckermen and Merton concluded that the reviewing eyetem apparently does exactly what it is supposed to do, elft out the good papers from the bed.

The question of cenegrable must surely stand or fell on

The question of ceneorship muet surely stend or fell on whether partieen judgements or hersh raviews heva created (in the worde of Ziman [1968]) is hidden treesure of rajected worke of geniue which would heve revolutionized our view of Neture had thay been published. It Ziman thinka not, and I think not, too. I agree with Menheim [1973] and Broad [1981] that a more likely cause for the tellure of a good idea to take root would be ite burial in the tlood of publication that overwhelms scientists every day. Menheim makes the cese for higher journal standarda as a protection against this liood. I suppose it is every aditor's prerogativa to judge for himself the belenca point he wishes to occupy on the tightrope between the maintenance of journal standards on the one hend and the reduction of type I errors on the other.

Laetly, there is the quaetion of whethar a review system that maneges to reject only one querter of its submissions is experituous on that ground alone. This view naglects the fect that the remaining 75% may be strengthened. In addition, as Zuckerman end Merton have noted, the very existence of a reviewing system serves as a form of quality control. Knowing that their papers will be reviswed, authors take care in preparing them, and often the journet's high stendarde become their own.

Acknowladgments

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News

Update: Mt. St. Helens

ML St. Halens Volcano, Cascada Ranga, aoutharn Weshington, USA (46.20°N, 122.18°W). All times are local (GMT-7). Increased in the rate of deformation within the celer, SO₂ emission, end selsmicity preceded the extrusion of e new tobe onto the northesst portion of the composite lava dome in early Septembar. For the first time, seether conditions ellowed observation of the crater immediately before, during, and after an extrusion eplaode.

Beginning September 2, U.S. Gsologicel Survey (USGS) personnel working in the crater noted one to two rockfalls perhour and frequent audible and felt earthquekes. However, the earthquekes were probably very shallow, as no significent increese in seismicity was recorded by the University of Washington seismic net through September 4. Audible and felt earthquekes in the crater were nearly constant on September 5, and rockfalls increased turther, particularly from the overhanging northeastern portion of the Juns lobe. Recorded asismicity begsn to increase shortly after noon and increased more rapidly during the predawn hours of September 6, triggening a joint USGS-University of Washington advisory at 0800 September 6 that predicted a ome-building expertation within the part 12-48 hours.

ome-building eruption within the next 12-48 hours. During this period, sharply varying date were returned by he three continuously recording bubble tillmetere that had been inetalled in a roughly N-S line within 150 m of the east side of the composite dome in early July. After recordng about 80 urad/day of inflation between September 1 and 4, till at the northern instrument reversed to reletively slow deflation on September 5. Defistion continued on this slument until its telemetry was ended by a rockfall during he affernoon of September 6. No reversal of infliction occlined at the central Illimeter, about 175 m SE, where Inflaon had sccelerated through Juty and August and had leached a rate of 700 µrad/h on the morning of September E. This instrument recorded more than 10,000 µrad of inflaon on the 6th before an incandeacent boulder ended its elemstry during the afternoon. The southern tiltmeter (about 300 m SW of the central instrument) had recorded no significant tilt previously, but began to show deflation embar 5 that continued through the 8fh. The veriation hithe date recorded by these three instruments, combined with substantial differences in the rates of thrust fault movement sround tha dome, indicated to USGS personnel that the crater floor was behaving as a group of independent

blocks or pisies on a acale of the order of 100 m rather than as a single relatively coherent body.

The esismicity changed cheracter to lower-frequency Svenis with emergent arrivale after dawn on Saptember 8. About 1000 avaisnche events begen to dominsie the eelemic record, with only a few discrete low-frequency eventa appearing for the next several hours. USGS personnel working in the creier observed huge blocks falling from the lothesst portion of the June fobe and were soon forced to retreat to a ridge north of the crater. On the selamic record, avelanche events peaked about noon but remsined at high evels until sbout 1700. Cloude of dust from the frequent 1500-1530 it was evident to USGS personnel that the entis northeast portion of the June lobe was breaking up. A bulgs appeared to be developing on the east side of the bee, but poor viewing conditions made this observation uncertain. By 1800, 4700 and the observation of square meters of catain. By 1800-1700, an aree of tane of square metere of tesh levs was clearly visible on the dome, and by 1830, many glowing rockfells could be seen; some of the falling malerial eppeared to be liquid. The number of selsmic

evente began to decilna altar 1700. Significant numbers of low-frequency even:s rasumad briefly about 2200, but sais-micity dropped sharply at about 2330.

Alrcraft crawe monitoring the crater during tha night of Septamber 6–7 eaw numerous glowing rocklalls. By 0500 on Saptamber 7 a new lobe was clearly visible in the area formerly occupied by the northeast portion of the June lobe. Most of the northeast portion of the June loba had fallan as talua, but from its high point to the SW, tha Juna loba ramained intact. Slow essismic growth and downslopa eprsed of the new lobe ware continuing as of September 9. USGS tield partias reported that the new lobe was clearly lerger and sxlanded tarther downslope on September 10 than on the previous day end hed grown to roughly the size of the lobes extruded in previous episodes. Practse detarmination of the volume of the new loba and its daily growth rate swalt enalysis of eirphotoe and reduction of lietd data.

Information contacts: Tom Casadevall, Oan Dzurlsin, and Christins Haliker, USGS Field Offica, 301 E. McLsughlin, Vancouver, Washington 98663; Christina Boyko, Steven Malone, Elliot Endo, and Criag Weaver, Greduele Program in Geophysics, University of Weshington, Seattle, Washington 98195; Robert Tilling, USGS, Stop 908, National Centar, Reston, Virginia 22092.

Nation's Water OK Deapite Dry Spots

Streamflow conditions across the United States improved somewhat during August, with more ereas reporting normal flows then in previous months, according to a month-and chack by the U.S. Geological Survey.

USGS hydrologiets eaid that erese of low flow conditione persisted in much of the Weet and etratched acrose the Southeast from Virginia south to Florida and west to Louisiena. A small eres of New York and most of Connecticut and Rhode Island were elso well below normal—within the lowest 25% of record; that is, 75% of the time, streamliow will agust or exceed the measured levels.

STREAMFLOW OUTING AUGUST

Above nermot In nor twithin the highest 25 percent of record for this month)

In normet renge

Below normal
(within the lawes) 25
percent of record for
this manifi

About one third of the 164 key Index atelions reporting In Auguet showed well below normal streamliow in parts of 24 stetes. The low flow conditions ere reletively unchanged from those reported lest month, when 23 atates reported extreme low llows.

In contrast to the erees of low flow, atreemtiow in the Great Lekes region was generally well above normal, as were flows in northern New Engishd end portions of the Oskotas. Southeastern Texas reported high flows end near-record local flooding in some areas.

indicative of the generally good conditions in much of the

SCHOLARSHIP ASSISTANCE

For Minority Students in Earth, Space, and Marine Sciences Available For 1982-1983

AGU is again perticipating in the American Geological Institute's Minority Participation Program of Scholarship Assistence. Matching funds from a NOAA sea grant have also been requested, end funding may be available specifically for marine science students. To qualify, applicants must be the follow-

ng:

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Black, American Indian, or Hispanic

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For a flyer for your student, call or write to:

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American Geophysical Union
2000 Florida Avenue, N.W.
Washington, D.C. 20009
(selephone: 202/462-6903)

For application forms, write to:

William H. Mathews III
Director of Education
American Geological Institute
Box 1003 t, Lamar University Station
Beaumont, Texas 77710

DEADLINE FOR RECEIPT OF COMPLETED APPLICATIONS IS FEBRUARY 1, 1982.

country, the combined tlow of the netion's 'Big Five' rivers (Miesiesippi, St. Lawrance, Columbia, Ohio, and Missouri) avaraged 690 billion gallons e day during August, 31% above normal. August marks the third straight month of above-normal tlow of the Big Five, after 6 straight months of below-normal conditions. The Big Five, which account for stream runoff in about half of the conferminous United Stalas, provida a quick check on the pulsa of the nation'a water resources. (Photo credit: U.S. Geological Survey, Dapartmani ot tha inlarior.)

Linking Star Age and Rotation

As a slar egas, it rotatae mora and mora slowly. Aetronomare believa That etatlar winda (ascaping gaeae that carry trappad magnatic tialds to great diatancas) ara tha causa: thay gradually drain the ater of its inbom rotational momentum. Also, with increasing aga a star'a magnatic activity daclinae. Ara the two phanomane-slowing rotation and dacreasing magnatic activity-ralated? Arthur H. Vaughen of tha Mount Wilson and Las Campanas obsarvatoriae raporte avidance that rotation of stare similar to the eur varies with thair observed magnatic bahavior.

Vaughan and his coworkare davafoped e naw mathod for maasuring how rapidly stare rolata. Ralatively liitla had bean known about the roletional rates of stars like the eun bacause their rotation speade era ottan too small to maaeura by classical epeciroscopic maans. The mathod, lo ba describad in the November Astrophysical Journal, is an adaplation of work dona since 1988 by Olin C. Wilson at tha Mount Witson Obsarvatory.

In most ordinary stars, dark 'spota,' corresponding to aunspols, would be imparcapilbla. However, it is known from the sun that auch spots or groups of spote are accompaniad by inlansa amission of light at two particular wavalangths visible through the earth's atmosphere: the H and K linas of ionizad calcium. By maasuring the atrangth of itrasa amission linea, Vaughan'a group was abla lo sludy alallar magnolism and to datact affacts of rotation. From these maasuremanta aprings new avidanca tinking staller rolation ralea and magnatic intansitias.

Veughan's group lound that among stars of a given apactral lypa (or surfaca lamparature, stollar radius, or mass), the tester the rotation, the greater the average feval ol a elar a magnatic activity. Thay basa thair work on 100 consecutive alt-night observations of 54 stars.

Reduced Rates for AIP Journals

Tha Amarican Instituta of Physics (AIP) offars raducadrala subscriptions of its journels to Individual membars of affiliated societies, including AGU. The offer is limited to ona subscription par parson to each fournat. Ratas for 1982 for AGU mambara are given below:

	•	
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To lake advantage of this discount service, AGU mambers should sand aubscription orders, remittances, and a stalament Indicating mambarship status to AIP, 33S East 45th St., Naw York, NY 10017. 🕱

New Publications

Petrology and Genesis of Leucite-Bearing Rocks A. K. Gupla and K. Yeol, Minerals and Rocks, vol. 14.

Springar-Varieg, Naw York, 2S2 pp., 1980, \$39.00.

Reviewed by D. M. Frencla

in the prefece, the euthore state the need for a 'reviewsynthesis' of the data available on high-potaselum voicenic associations. As a review, their book la a valuable source tor information and references concerning this unusual, but wida spread, class of volcanic rocks. It is particularly useful as a collection of representative whole rock enalyses and axperimanial results of relevant cheea aquilibria etudiaa. Aa a synthasis, howavar, thie book leavas much to ba dasired. The authore have chosen to parephrase or quote the works of others, adding little in the way of comparison, availation, or Interpretation of the results of these works. The job of diailliaiton end synthesie le latt to the reader. This is a problam that runa throughout the book. In the chapter on nomanciature, they begin well by advocating the usa of atendard rock names such as baeanlis and taphrita with minarel modifiers (l.e., leucite beeanita). Thay rapidly dascend, however, into the bizarra alkaline world of jumilities, eranditas, atc., making little altampt to clean up this lagacy of a parochial aga in gaology. In the chapter describing individual localities, the authore again paraphrage original reporte so that one wonders about the relationships between such 'craaturea' ea tha litzroyltas ol Australia and tha wyomingliaa of thair namasaka. Fraquantly, diffarant chamical or minaralogical plota (attar the original raporta) are amployed for diffarent occurrences. It is the reader who must all Ihrough the actual whole rock analysea in an affort to compara and contrast the individual volcanic aultas. This work should have been done by the authore, both in the text and through the use of common chemical plots.

Tha final chaptar on possible origins of highly potassic magmas is the only one in which the authors altempt a critical evaluation rather then a practe of the results and

Honor Your Colleagues

The Fellows Committee of AGU

This committee, under the chairmenship of Nichotes C. Matalas, la seaking nominationa for Fallowa ot the Union. Nominaas for fallowship abould be scientiete who have at-

tained acknowledged aminance in a branch oi geophysics. Fallows' nominations must be made on forme available trom the Mamber Programs Division, American Geophysical Union, 2000 Florida Avanua, N.W., Washington, D.C. 20009 (talaphona: 202/462-6903 or toll frea 800/424-2488). Fellowa alectad in 1981 ware:

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DEADLINE FOR NOMINATIONS IS **NOVEMBER 15, 1981**

hypothasas of pravious studies. In doing so, however, they devota an inordinata amount of attantion to old, out of day ideas and very little attention to devaloping the pratered modal involving the mailing of a phiogophie-rich manife sourca. Much could have been discussed in relation to this hypothaels, including mantia matasomatism, implications of tha relative etablities of mice and amphibole, the possible involvament of the low valocity zone, tectonic significance, atc., but was not! To say simply that potassium-rich mag. mae are generated from potassium-rich mentile only transfars tha problam.

From a tachnical point of view, I am concerned about the treatment of the chamistry of these rocks. There is no section that discusses their major element compositions and resultant implications. This inattantion gets the authors into difficulty when they infer, from experimental results on simple eyatams, that taphrita will fractionate to basanite, inepaction of ralavant raal whole rock analyses indicates that tha revares must be the case. The chapter on mineralogy gives compositional deta in waight parcant with no converalon to formula notation. Without this, the extent and signifcance of minaral aolid aclution cannot be appreciated. The cheptar on traca alamanta and isotopic data is elso inadequata. Traca alamant data ara aimply llated (meny ol with ars datad) with no discussion of the bahavior and implications of characteristic groups euch as LIL alements, high flaid strangth alamanta, and highly compatible alements. Similarly, there is little discussion of the significance of the isotopic data givan for thasa rocks.

In aummary, this book has value as a compilation under ona covar of much of tha data avallable on highly potassic volcanic rocks. It is assantially, howavar, a book of lists. Unfortunately, the authors have mleased the opportunity, which thie typa of format providas, to contribute a comprehansiva synthaela of tha stata of knowladga on this type of volcanism. It is indicative of the book as a whole, I think, that no atatamant of current problams nor suggestions for diractions of futura rasaarch ara made. Opinions are required of axparts as wall as tacts!

D. M. Francis is with the Depertment of Geology, McGill University, Montreel, Quebec, Cenede.

New Listings

Itams listed in Naw Publications can be ordered directly from the publisher; they are not evallable through AGU.

Minarels from the Merine Environment, Sir Peter Kant, John Wilay, Naw York, vill + 88 pp., 1981, \$13.95.

The Ocean Beeins and Mergins, vol. S. The Arctic Ocean, A. E. Naim, M. Churkin, Jr., and F. G. Stehli (Eds.), Pien-

um, Naw York, xlv + 872 pp., 1981, \$55.00. Paleoecology, Concepts and Applications, J. R. Dodd and R. J. Stanton, Jr., John Wilay, Naw York, xiv + \$59 pp. 1981, \$39.95.

Pollution Pricing: Industriel Responsa to Westeweler Cherges, J. F. Hudson, E. E. Laka, and D. S. Grossman, Laxington Books, Laxington, Maes. xix + 213 pp., 1981.

Precambrien Piete Tectonics: Developments in Precamonen Geology, 4, A. Krönar (Ed.), Elsavlar, New York, xxi + 781 pp., 1981, \$185.25.

The Urben Climete, H. E. Landsbarg, Academic, New York. x + 27S pp., 1981, \$29.50.

The World Ocean: An Introduction to Oceanography, 2nd ad., W. A. Anlkouchina and R. W. Starnberg, Prentice-Hall, Englawood Cliffa, N.J., xlii + 513 pp., 1981, \$19.95.

hydolst/Geologist: The University of geophysicists that it is for Geophysics, 12282 at Austin, Institute for Geophysics, 7021 research scientist positions are now sveileble 8 the University of Texas Institute for Geophysics h he fields of marine geophysics, lectonics, sels-ric statigraphy, asiamic reflection techniques and seing, ocean bottom selemometer (OBS) and other seismographic instrument deelign end depment, earthquake selemology, and tunar and

panetery setemology. The institute mainteins a modern dockeida facility a Gelveston, Texas (Gelveston Marina Geophysics Laboratory), where a new merine building will be building will be instale based in Austin. The Institute hee a modencomputer lacility for processing end enalyzing peophysical data and will be obtaining a new VAX live computer eyetem early next yeer. The NA GREEN and the R/V FREO H. MOORE, which here capabilities for conducting marine geophysical surveys including the collection of magnetics, multiod selamic raffection data [48-chennel], eonobuoy tels, and OBS rafrection and earthquaka date. This two-ship capability offers the exciting opportu-nity is conduct two-ship selemic experiments. In edition, the institute operates extensive salsmographic networks in several Central American and been counities. The institute meinteine close ies with the staff and fecliffies of the Osperiment of cical Sciences, which include modern radionetro, kolopa, and paleomagnetic taboratorias.

A Ph.O. degree le required, preferable in Geolo

or a Geophysics. Seleries era negotiable depanding upon experience and qualifications. The person must have the ability and desire to work on group pojects, conceive and initiate new projects, collect and reduce data, and publish the results. It you are enterested in this excellent apportunity to pursue a dailenging career in the forefront of geophy search in an academic setting, please send your allications and references to:

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mate sensing of vegetation and rock vegetation mixes. Candidete muet heve a Ph.O. in forestry or releted ectence, and a strong background in com-puter programming and operation of digital image processing systems.

Submit vites and names of three references to John 8. Adems, Chairman, Cept. of Geological Sci-ences, AJ-20, University of Weshington, Seettle, Washington 98185. Closing date in October 31,

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Sentor Faculty Pacitical Materiology Applications and nominations are invited for a sen-ior faculty position in mateorology, at the University of Utah. Eligible applicant will also be considered for cheirperson of the department. Candidatos must possesa e Ph O. In meteorology or a releted discipline. Applicants should have teaching and reseerch experience and be interested in participating in both the graduete and undergraduete progrems Applicants should submit curriculum vitae end nemes of three professional references to:

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University of Kanses/Sadimeateleg Structural Geotagy. The Ospartmeni of Geology of the University of Kanees, Lawrence, Kanees aks applicants for two lanure track app that will begin in the fell of 1882 or spring of 1983. Geologists who meet the requirements for linese positions and who can begin work in Jenuary 1882, are also invited to apply. Outlies include teaching in our introductory, undergradueta mejor, end gre ete courses; supervising graduate atudent theses and dieserletions; conducting original research; an and descretions; conducting original states and profes providing service through administrative and profes sonal activities. Appointment to either one of these positions is potentially at any academic rank, but one or the other or both will be filled at the assistessor level. Applicants must have the Ph.O. in hand or expect to complete it by the end of the lirst year of employment at the University. Minimus salery at the assistant professor level is \$23,000: salery for each position will be determined by renk

plicants in any branch of sedimentology, but those with interests in studying carbonate rocks, in disansals and sedimentary geochemistry, or in the relationships of sedimentation and tectonics are preferred. The applicant will be expected to cooper ete with present leculty in offering courses at the undergraduate and graduate level that cover ell aspects of the study of sedimentary rocks.

Position 2. Structural Geology, Regional Tector-

plicant will be expected to teach a basic undergrau uata structural geology course, offer gradueta courses or seminars in some areas listed ebove, plue cooperate with present laculty in offering other undergraduate or graduate courses in mineralogy. patrology, physical geology, or Precembrian geology. If no sultable candidates apply for this position, the department may recommend hiring two of the ants for pos

In the event the top candidates are about equally in the event the top candidates are epoint equally qualified, preference will be given to applicable for one of the positions who have expenence that will allow them to leach a modern course in petroleum and substriace geology or to applicants who will participele in the Department's summer field geolo-

gy teaching program.

Priority will be given to applications received by November 8, 1981. Applications will be accepted from questied candidates until the positions ere

Appacants should send a letter of application, a resume, and names of three references to: Anthony W. Walton Ospariment of Geogy The University of Kansas Lawrence, Kenees 66045 (913) \$84-4974

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STUDENT OPPORTUNITIES For special relas, query Robin Little, 800-424-2488.

y and students, and pursue own

per annum. Duties include providing technical and administrative supervision over employees and sc-tivities of GRDL; advising officials on the state of Inga: and advising and consuming scientists and ex-ecutives in improvement of geodesy and related fields. Experience in management of scientific pro-grams, geodesy, and solid earth sciences is re-quired. Apply to: NOAA/NOS-6001 Executive Bou-levard, Rockville, Manyland 20852. Alin: MB/

NOAA is an equal opportunity employer.

POSITIONS AVAILABLE

Arizona Stata University, Department of Chemistry, Visiting professor, 1992-83 academic year or part thereof. We seek e person or persons with established research programs in geochamis-iry, minarelogy, petrology, end/or solid etate chem-lary to teach advanced special topics course(s), in research May be an excellent eebbalical opportunity for esteblished scionisis. Contact: A Navrotsky.

Department of Chemistry, Arizone State University. Tampe, AZ 85281, |602| 985-4241.

Directors Geodatic Survay, NOAA. The Ne-tional Oceanic and Almospheric Admisiration (NOAA) announces o Senior Executive Service Vacancy for the position of director, Geodetic Research and Development Laboratory (GROL) in the National Geodetic Survey, a component of the Netional Ocean Survey. The duty location is Rockville, Maryland The salary range is \$47,839—\$50,112.50 oner arrown. Duties include appendictor templated and tyries of CHILL; advang onicials on the etate of scientific knowledge in geodesy and making recom-mendations for research and development; exercis-ing scientific and lechinical knowledge of contribut-ing publications to professional journals and making presentations at netional and international meet-ings; and advising and consulting scientists and ex-acustives in improvement at desclars and released

Research Associate is Gasshamistry/Usi-versity of Chicage. Post-doctoral position in-volving extraction of interesamples from meteorities under dean conditions and analysis for major and trace elements by instrumental and rediochemical neutron activation. Goal le to invastigata bahavior of the elements during condensation of the solar

Experience in geological samples an asset, in metaoritas a dafinite plue and in radiochamtelry a necessity. Send vila end nemes of two referees to Professor Lawrence Groseman, Department of Geophysical Sciences and Enrice Fermi inelliule, University of Chicago, Chicago, Illinois 30537.

The University of Chicago is an effirmative ac-

City University of New York, fürsekiyn Collegeji Faculty Poultians. The Oepartment of Geology enticipates filing several tenurs tack positions at Full Professor level. (Salary range up to \$43,400). Highly qualitied individuals will be considered for distinguished appointments at an additional \$5,000.

While cendidates who have distinguished them-

While candidates who have distinguished themseives in any field are welcome to contact us, we
are perticularly interested in openings in: anergy resources (coal/petroleum), exploration geophysics,
environmental geology or hydrogeology, coastal
sedimentology, economic geology.
Successful applicants will be required to inetitute
an active research program, supervise Master's
and Ph.D. thesses. Normalations and applicatione
with current vitae should be sent to: Or. S. Bhattacharf, Chairman, Oept. of Geology, Brooklyn College of City University of New York, Brooklyn, New
York 11210. Poeffions open until filled.
Brooklyn College, CUNY, le an attimative action/
equal opportunity, employer, equal opportunity employer

University of Naw Gricacs/Gaophy sloiet. sition commencing August 1982, in exploration geophysics. The Ph.O. or equivalent experience is

recommandation to Or. Gordon Frey, Department of Earth Sciencea, Lake Front, University of New Orleans, New Orleans, LA 70122.

Please send application, including the names of referees, to Thomas W. Dennelly, Chairman, Oe-partment of Geological Sciences, State University of New York, Binghamton, New York 13901. We are an equal opportunity/affirmative action 1、11年中国中国国际企业的企业的企业的企业。

Applications are invited for a permanent faculty po-

Appointee will be expected to teach graduate eral geology, conduct a program of research, auwise theses and oversee a program in geophysics. The position will be at the assistant prolevel or higher depanding on background. Applica-tione are ancouraged from individuals with industri-al experience, including recent retirees. Applicants should send a letter outlining interest

in position, complate résumé, and three latters of UNO is an equal opportunity/affirmative-action employer. Applications from minority groups ere epecifically invited.

Nydrogeologist. The atete University of New York at Ginghamton is re-opening its eserch for an assistant or associate protessor of hydrogeology to join a department already active in several steas of weter studies. The applicant should have a PhD and spontage as welland experience in mathemetical techniques, as well as field experience. The applicant will be respond-ble for instruction at both the undergraduete and graduals, levele and for developing a program of re-search. The position will be illied in September

Engineering Geologist Gaophysicist. The Oaperiment of Oeological Sciences, University of Saskatchewan, has a vacant tonurable position in engineering geology/geophysics Applicants should be qualified to feach undergreduete and

graduate courses and to conduct research in angl nearing geology. A background in structural geolo gy may be eppropriate. Well-aquipped facil available for research in rock mechanics, itirid flow through poroua modia, ecousic, end alectrical proporties of rocks, and pormatrost. Oded opportu nitian axisi for Joini research with qualifications and experience. Send epplicationo, dotatod poseonol resuma trickyding the names of et losst three relarees, and other supporting dato to Or. W.O.E. Cold-well, Head, Department of Ocological Sciences, University of Sasketchewen, Sesketoon, Sasketchewan, S7N OWO.

Please note: until Novamber 15, 1997 consideretion will be given only to applicants who are Canadians of landed immigrants, ofter thet date ell eppli-cations will be considered

Postdootoral Positionr Hydrologist/Soit Physicist. Rosenrch related to aubstriece radioactive westos alorage in unselurated frectured rock; assessmont and prediction of water and soluto transport. Selary \$20,000 to \$24,000 depending on qualifications Position evallable Octobor 1, 1061. Send resumé, transcript, and reprints of majoi publications to Or Daniel O Evens, Department t Hydrology end Water Rosourcas, University of

Equal opportunity effirmative schon, title tX aec-tion 504 amployer.

Faculty Position: Environmental Engineering. Beginning Jenuory or Ceptombar 1982 Tho on requires undergroduate and graduate areas of water quality control and water resources An earned doctornto is required and at least one degrea in civil engineering is proferred. Nank will be not the assistant professor level and anlary will depend upon qualifications. Apply to. Or. Losfor A. Hoof, Chairman, Depentment of Civil Engineering. Univarsity of Virginia, Charlottosvillo, Virginia

An affirmative action/aqual opportunity amployer,

Dapariment of Gaology/Geography: Howerd University. Applications are invited for ton-ura freck position in goology beginning August 1981. Cendidates should have PhO and strong background in mineralogy, potrology, and geophys-ics with industry exponence dasymble; will leach and advise at undergraduate level and help iniliste eduato progrem in near tulure. Musi havo sensitivity to special problems discks tace in antoning fiski, and commitment to their greater representa-ren Applicants should sand resume with reterencea to Or. Dav.d Schwortzman, Chairman, Dept Geology Geography, Howard University, Washington, O.C. 20059.

An equel opportunity offirmetive ection amployer

Purdue University. The Capariment of Geosciences invites applications for a faculty position, starting January or July 1982, In the broad field of minstalogy-petrology-geochemistry. A Ph.O. lo required and preference may be given to scientists with an ostablished record of research. The Department has an eutometed electron microprobe, mess spectromater and laboratory for stable isotope sludles, full range of high tamperatura and high pres-sure equipment, including tumaces for controlled 102 experiments, as well as X-ray equipment. The successful applicant will be expected to participate in both the undergreduate leaching end graduate studies programs, as well as actively angage in ra-search. Rank and salary are open but will be com-

Purdua Liniversity is a land grant, state support-

Meetings

Space Plasmas

NATO Conference on

During the week of April 21-28, 1961, a group of re-

search physicists with a special interest in artiliciat particle

beama as epplied to epace plasma atudies met at a confer-

ence sile al Gelio, in the mountains of central Norway. Ma-

for support was provided by NATO, and the meeting was

ed institution committed to ecademic excellence, and is an equal opportunity/equal access employer O. A. Meyer, Oant of Geosciences Purrius Univer sity, Wosi Laleysite, IN 47907 [Tel. 317-494-3271]. Ciceing deta for applications is November 10.

Staff Officers Climate &card, National Research Council. The Climate Search ftha National Research Council Invites epplications for a position ao principol staff officer lor a two-year i view end assassment of the implications of increas ing almospheric cerbon dioxide. The incumbant wi organize mostlings of the study committee and related groupe, dualt and edit raports, supervise cleri calledministretive/financial matters, maintein lielson with ledotal government end international activities, assist in coordinetion of raisted National Research Council activities, end participate in support of oth-

ar Climete Boerd activities es required. Applicants should have a doctorets or equivelent in a physical or social science eree related to the carbon dioxide Issua; demonstrated organizations managerial ability: proven ability to produce sciantifically cound, July documented, and claerly written papere on sciantific and technical subjects; end ibility to deal with interdisciplinary isouge and multidisciplinary groupe ere dealred, together with broad axportence in scientific research or administration. The epplicant's primery expertion may be either in physical sciances (e.g., meteorology, oceanogra-phy, chamistry) or in rolevant social sciences (e.g.

economics) with working femiliarity with the other.
The eppointment will be for an initial period of ono year at e salary between \$35,000 to \$41,500, depending on qualifications and experience. It is oxpocted that extension for a second year with be available. Applicants should send latters of application end resumes to Dr. John S. Perry, Climate Boord JJH 4041, Nniional Acadomy of Sciences, 2101 Constitution Avo., N.W., Washington, O.C. 20418, or call (202) 389-9102.

Gaophyeios Position. The Physics Depertment of the University of New Orleans Invites appliins for tenure treck positiono avellable Janua 1982 or August 1982. Rank and selary are to be commansurate with experience end Iraining. Candidates with background in gaophysics, acoustics or computational physics are especially encouraged to epply. Tho UNO departments of Earth Sciencee and Physics are jointly developing progrems and curricule to raspond to the demand for graduates in geophysics in the local metropolitan orea end in tha

south cantrel U.S. The successful applicant can expect colleborative rescerch support from laculty active in eignel proceasing and enhoncement techniques and in inverse ering analysis. Other araos of departmentel re aceitering analysis. Other araba of departmenter re-search involve etomic, molaculer, end colid stete physics, cryogonic geophysics, hydrodynemics end computational physics Applicants should sand e résumé to Professor J. Murphy, Saerch Committee, Physico Department, University of New Orleano, New Ozleans, 1 & 70148 Naw Otleans, LA 70148.

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Virginia Polytechnic Instituta and Stata University: Sanior Research Associata. Intelesting and abundent research and publishing op-portunities, including new University-owned MDS-10 VtaROSEIS system, VAX 11/790 computer. Must have experience in theory and application of reflection seismology, and be interested in the application of reliaction selemology to the solution of

Sand resumes to: O. O. R. Wones, Department ol Osofogical Sciencea, Virginia Polytechnic Inali-tute and State University, Glackeburg, VA 24081-

The University is an equal opportunity/affirmative

Salamologiat. The State University of New York at Binghamion has e vecency for a seismold gist at assistant professor level. Ph.D. degree hold-ers with research interest in exploration estamology or earthquake ealsmology with solid theoratical background are welcome to apply.

The successful candidate is expected to teach courses in applied geophysics, time series enalysis wave propagation, etc. Ph.O. with 0 to 5 years of teaching, research end/or industrial experience is appropriate for the position. Salery negotiable ar

ences to Cheirman, Gaophysicel Saarch Committes, Department of Osological Sciences, State University of New York at Binghemion, New York

Please send resume and names of three refer-

Wa are an equel opportunity/affirmative action

Dirastor, Office of Programe and Interno-tional Affairs. The Office of Research and Da-velopment, National Oceanic and Atmospheric Adinistration (NOAA), has announced the vacancy of Director, Office of Programs and International Activities, located in Rockvilla, Maryland. The Office of Research end Development is responsible for administering an integrated program of research, technology and advenced engineering development and treater refeting to the oceans, the Orest Lakes, the U.S. coastal waters, the lower end un-Lakes, the U.S. coastal waters, the lower end upper almosphere, and the sofer and terrestriel environment to increese understanding of the anvironent and human impact tharson, and thus provide the scientific basis for improved services. The Di-rector, Office of Programs and International Activ-lies, oversees the coordinated development of poli-cies, programs and budgets, and international ac-tivities within the Office of the Assistant Administrator for Research and Development. This is an exciting and challenging opportunity for an individual with demonstrated knowledge of (1) ocean-

ographic, meteorological, environmental, physical end/or angineering sciences (including at least 24 semester hours in physical science and/or closely releied anginaering sciance of the college levet or ebovel, or (2) program analysis techniques and methods involving broad experience in sciantific end technological programs related to the oceans or the atmosphare. A knowledge of U.S. policies on tractices and internetional multileteral end biletaral agreemente le daelrable.

SALARY: This position will be filled under the Genlor Executive Sarvice (SES). Salary could range from \$47,890 to \$50,112,50 per annum.

APPLICATION: Interested persons should cend a U.S. Standard Form 171, Personal Qualifications Statement by October 8, 1981, to Mrs. Suean Ciaer, Personnel Management Specialist, Offica of Parsonnel, MB/PER1t, NOAA, 800r Exaculiva

Oulevard, Rockville, Maryland 20852.
Tha Department of Commerce, National Oceanic and Atmospheric Administration is an equal oppor-

Paculty Positions The University of Jows. The Caperiment of Physics and Astronomy anticipates one or two openings for tenura-treck laculty in August 1982 One or more visiting profes sorships, at any rank, are also expected to be avellable. Pratarence will be given to candidates with research activity in the following exparimental and theoretical areas: estronomy, astrophysice, atomic physics, condensed matter physics, calementary particle physics, nuclear physics, plasma physics, end space physics. The positions involve understanding the property of the provided physics. dergraduete and gradueta teaching, guidance of re-easnch students, and personal research. Interested persons should sand a résumé, a sistement of research interests, and the names of three profes-sional references to Search Committee, Capart-ment of Physics and Astronomy, The University of

va, lowa City, IA 52242. The University of lower is an equal opportunity/el-firmative action amployer.

Coal Coposite. If you are Onencing, planning,

exploring, drilling, or digging in connection with any torm of anergy, you need this complete, up-to-dete book about the world's coat deposite, includes production and reserves for mines. Hardcover, 8 × 8 inches, 590 pages. Teble of contents, drawings, inches, 590 pages. Teble of sendates dex, reterencae, 1980. \$159. Talach Associa Thunder Road, Sudbury, MA 01775, USA.

H6A Amphibolea Short Course. The Mineralogical Society of America will eponsor a Short Course on Amphibotaa and Other Hydrous Pyri-boles at the Marydela Retreal Center in Erlanger, Kartucky, October 28 to Novamber 1, 1981, before the MSA/GSA Annual Meeting in Cincinnati, Ohio.

J. a. Thompson, Jr. [Harvard)—Polysomalism and polytypism in pydboles
 F. C. Hawthoma (Manifoba)—Crystal chemis-

Iry of emphiboles S. Ghose (Univ. Weshington)—Subsolidus re-

ections of emphiboles
P. Robinson (Univ. Massachueette)—Amphiboles of metamorphic rocks

M. C. Olibert (VPI)—Phase equilibria and em-

phiboles of Igneous racks O. R. Vebien (Johna Hopkina) (Convenor and Editor)—Wide-chain pryibolae T. Zoltal (Univ. Minnesote)—Mineralogy of am-

M. Rosa (USGe)—Geological occurrence of

Contact: MSA, 2000 Floride Avenua, N.W., Wash-Ingion, O.C. 20009. Talaphona: 202/4928913. Regiatration Deadlina: October 1, 1981.

ANNOUNCEMENTS

53rd Annuel Moeting, Selemological Gool-ety of America. Abstract deadline September 25 for 53rd Annuel Meeting of Eastern Section, Selemological Society of America, Oct. 26-2e, 1981, Milwaukee, Wi. (R. W. Taylor, Univ. of Wisconsin-Milwaukee, Oept. of Geological Sciences, Milwaukee, Wt 53201).

STUDENT OPPORTUNITIES

Earth Sciences Assistentships and Fellow ships. Research asaletantehipa end lellowships are available to graduate students in the earth sciences from the Columbia University Oapariment of Osological Sciences. The awarda covar luition end less, end provide a yearly stipend of between \$8400 and \$8180.

Research la cerried out et effilieted instilutions including the Lemont-Doharty Geological Observatory, the Goddard Institute for Space Studies, and the American Museum of Natural History. Research topice available to etudente reflect the intereste of the more than 300 Ph.O.-level scientists et these tuliona and apan virtually avery area of the

The department ancourages applications from students with an undergraduate degree in any of the natural sciences or angineering. For addit Information please contact Ms. Mia Leo, Depertment of Geological Sciences, Columbia University. Lamoni-Doharty Oeological Observatory, Pall-aedes, New York, 10964.

Graduato Rasaaroh Accietentahips in

Physical Goesnography. Opportunities for graduate etudy with Research assistentiship available for etudents interacted in M.S. or Ph.O. programa. A summer program with atteand is open to college juniors, Write: Dougles Caldwell, School of Oceanography, Oragon State University, Corvalla, OR 97331

Nominations for Awards

November 15 is the deadline for nominetions from the memberahip for AGU Fellows and December 15 for awards or 1982. Nominations for Fellows must be made on forms available from the AGU office. Nominationa for medalists and awardeee require only a letter of nomination and eupportling malerial. The Bowle Medal, Ewing Medal, Horton Medel and Macelwane Award committees are accepting ominations for 1982 at this time.

search on the beam plasma subject accompanying the singe of interest in fusion plasmas, one was impressed at his conference that many facets of the situation have been studied and clarified, with the basic motivation coming from hespace applications. At BPD Ignition the original monoenergatic beam electrons are strongly thermalized but are also accelerated above the injected energy. The accelerafon of particles by plasma instabilities, which obviously has importent implications in space, also dates back to the work

Another fecet of the problem involved natural auroral beems and the accompanying instabilities in an attempt to understand the discrete particle spectra and other characteristice of the aurora. In one set of experiments, electron team echoee were sought from double leyere supposedly existing on auroral field lines.

Electron beame have been used extensively to probe laboratory plasmaa, but at Gello the analogous technique alusing particle beams to probe the distant magnetosphere to investigate magnetic field morphology, electric tielde, pasma interactione, strong pitch angle scattering, and parto anergization near the equalorial plane was described. Trese experiments are technically difficult but give basic internation about magnetospheric dynamics not obtainable ty other means.

Vehicls charging during beam injection has been much discussed and was well aummarized at the conference, using experiments both from rockets in the lonosphere and cecraft in distant orbits. It is clear that during the case of electron beam injection the vehicle potential rises and the flow of relum current carried by ambient plasma eleclos can produce a discharge (not a BPD) with the production of light, heat, and plasma wave activity.

Positive ion and plasma beams have been injected in space from many experiments and were described in some detail, including the phenomenon of wave production and tapping in the region produced by the plasma injection. An electron beam on the space shuttle is an essential component of the proposed 'Tether' system, in which a ing conductor will be deployed in orbit. Many features of findion beam injection and vehicle potential changes are

basic to the 'Tether' experiments. The conference served a useful purpose in presenting a melange of laboratory and epace plasma results, including ways, particle and plasma diagnostics, and detailed theory ¥1d, el leest for the writer, provided a major clarification in understanding how beams interact with laboratory and space plasmae. A comprehensive proceedings of the conference will soon be published by Plenum Press. Bjorn Grandal of the Norwegian Defense Research Establishwill be the editor.

This meeting report was prepared by J. R. Winckler of the Tale Laboratory of Physics, University of Minneaota. Conference on Scientific Ocean Drilling Sponsored by JOIDES

ORGANIZATION AND COORDINATION OF PLANS FOR FUTURE **SCIENTIFIC OCEAN DRILLING PROGRAMS**

November 16-18, 1981, Austin, Texas Convened by: COSOD Steering Committee, R. L. Lorson, Chairmon

Sessions Planned:

November 16, 17

Raports and workshop discussions on the relation of the following topics to ocean drilling: 1. Origin and Evolution of Oceanic Crust

2. Origin and Evolution of Marine Sedimentery Sequences

3. Tactonic Evolution of Continental Margins and Oceanic Crusi

4. Causes of Long-Term Changes in the Atmosphere, Oceans, Cryosphere, Blosphere, end Magnelic Field

5. Tools, Techniques, and Associated

General Discussion on Coordination of Existing and Planned Scientific Ocenn **Drilling Programa**

The meeting will be open to the general scientific cran munity, and there is no registration lee. The conference will begin at 9:00 AM on November 16 at the Joe C. Thompson Conference Center, Room 3-1(12, on the University of Texes compus. For hotel reservations and other travel arrangements, pleese contect Mercury Travel, 1333 New Hampshire Ave., N.W., Washington D.C. 20036, phone (202) 296-7862.

Changes

Tha comptata Gaophysical Yaar last appeared in the August 25 Boldiaca type indicates meetings sponsored or cosponsored by

1983

June 13-15 International Symposium on Gas Transfar at Water Surfeces, additional contact. G. H. Jirka, School of Civil and Environmental Engineer Ing, Comell University, Hollister Hall, Ithaca, NY 14853.

New Listings

1981

Oct 12-13 Lake Reeloration Technology Institute, Madison, Wis. Sponsor, University of Wisconein-Extension. (F. Driscoll, Program Director, University of Wisconsin-

Ocean Sciences: AGU/ASLO **Joint Meeting**

February 16-10, 1982 Sen Antonio, Taxas Convenor: W. D. Nowilli, Jr., (AGU) and R. W. Eppley (ASLO)

Abstruct Dearlline: November 10, 1981 AGU/ASLO (Joint Meeting February 15 19 1962 San Antonio Taxas

CEAN SCIEN

Speclal Sessions *Arldithmal special session

Genus Climate and Biological Productivity Comme-

Overvlaw of Largo Oceanographic Projects Blology and Physics of Gulf Stream Rings Ridathus Bitween Birdogy and Circulation in the Bulf of Movies

Conlogical Ellents of Ocean Circulation Anthropogenic inputs to the Ocean: Divorse Prints of View

Processes and Resources of the North Poellic

Sholves Small Lake Limnology

Marine and Frashwaler Rioturbatton Geom-River Interaction: Sedimentation and Chem-

Parthdo Fluxes to the Water Calumn and Renthlo

Boundary Layer Robitions Butwoon Alesescula Physical and Biologi-

ral Punasses Crastal Princesors

Large Lakes

Rinbighal and Physical Measurement Techniques Microscale Processes and Effects on Riota Physics and Biology of Ico Edges Physical, Chemical and Biological Processes in

"SANDS (Shelf and Nearshope Dynamics of Sediunadationt

Call for paners imblished in EOS, June 23.

Extension, Department of Engineering and Applied Science, 432 North Lake Street, Madison, WI 53706).

1982

May 17-22 Symposium on Remote Sonsing and Mineral Exploration, Oltawa, Ontario, Canada, Sponsor, Committee on Space Research (COSPAR) of the International Committee of Scientific Unions (ICSU), (W. D. Carter, EROS Office, U.S.G.S. (MS 730), Resion, VA 22092.) June 7-9 Fourth Canadian Symposium on Mining Survey ing and Deformetion Measurements, Banff, Alberta, Can-

eda. Sponsors, Shallech Canada, Surveying Enginaer-Ing, University of Calgary. (F. B. Claridge, D. R. Piteau and Associates Ltd., Suite 300, t615 t0th Avenue S.W., Calgary, Alberta, Canada T3C OJ7.)

Sapt. 13-18 45th Annual Meeting of the Mateoritical Society, St. Louis, Mo. (G. Crozaz, Washington University, Box 1105, SI. Louis, MO 83130.)

GAP

Geomagnetism and

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increase for m). I and thee decrease. The mag-netic data size engages that the symrabile climomagnesites are pendo-single dearined (PSD) and with increasing degrees of outdation these FED grains become more 30-17m. The besit samples from size 417D are divided lote lies grained pillow basales and course Ersiand country lines. Ment of the anguacle properties managered are distinctly different between these sessive flows. Most of the asgratch property measured are distinctly different backets the groups. The segments dest indicate the two groups. The segments dest indicate the tho double sters of thus bassics are probabled. Nathough it is dillicist to represent the siless of grain size and exidation on the rapactic properties of these bessite, it appears not be the properties of these bessite, it appears netic properties of these besite, it appears
that grein size effects prindmints. A prailainery investigation of the segments vierosity of
the synthetic and occamic citanomyhealiss maggest that s dosbiration of thermally activated
and diffusive magnetic viscosity is responsible
for their visrous behavior. Finally, we sail
discute the roles of grein size and opidation
variation in messaio baseles and their separats
and combined efforts on their magnetic behavior.
J. Geophys. Fas., Rad, Paper 181336

3/20 Climatology CLIMATIC SIGNALS OF THE ANTAICT IO OCEAN J.O. Fistober (Environmental Esperich Laborstories SIA, 325 Broadung Boulder CD 80303), U. Esdok and

ITAG General (Irrulation GENGENIC "Set "Bu AS A BASE OF ATMISTRIBE TRASSPORT PROCESSES. G.M. Rairbock and F. Ylou Flabbrastoire Pome Pernes. Centru de Specifonatris furfásire et de Spectra-mètric de Maste, 91400 Gray - France. M. Truorau, A.M. Lulmenu, M. Hucuvio, J.C. Bavel, Institut des Sciences Surlibsires, 18026 Gruorbie -

Bring accelerator spectrometrs to marting "Be, she ratio of the conseguir indepen "fee," Be has been detreated in a served phase so 2.7 South fufe ground level are litters. It is argued that

photol. Heophys. Kos. 1982., Papri 319215

1740 Geniral Cirrulation
AN ADMECTMS NOTE: FOR TWO OLIGINAL TRANSPORT
OF STRATOSPHERIC TRACE SPECIES
Large S. Nolron Dept. ol Alpospheric Egicotes.
University ol Mashington, Swettis, Wash. 981951
A parameterization of Ivo-diseasional Transport
is developed for application to photochecical
models of stratospheric item species. It is
shown that is a licet approximation traces
trousport in the excidence place may be trusted
as an elementar. Traces that a diffusion. Process as an advancira, richet than a diffusive, process
The Dana excident solies used in this devectlys
model to a medition delaries mean which is a good model to a modified Enterich mean which is a good spyrousisation to a lagroughm can metter. The potential of the proposed parameter interior is demonstrated by a simple numerical emperiment in which the equilibries distribution in computed for a tracer with a cultura tropospheric source and a stratement with a proportional to the local mixing ratio. The resulting distri-bution is momentar in inlar to the observed distribution of M₂O in the stratesphere. J. Gacabre. Enn., Oress, Paper 1 C1365

3740 Geomral Sixtelation
THS EFFECT OF A GROGRAPHICAL CLOUD DISTRIBUTION
ON CLUMPER A REMEDICAL PRESENCE WITH AN
ATHORNESIC COMPRAL CHECKATON MODEL
O, F. Halsenho (Mile Geophymical Chemymiory,
Forbymbev Ret. f. 194015, Leningand, PRSSE and 3. T. Wethereld

This study is an alient to estimate the effect
of a geographical distribution of clouds on citeats. 'A esthed oil determination of a threedisemploant should distribution is groposed. It
is best on the soleties of the inverse problem
for the sadistise transfer equation. By ucing

climatic data to hotel ricus arours, competition siving racio of water water and satellite date on totating larguage radiation, the global des-sitiations of high, adding and low climic ware conjured for July. The derived wavefuel should conjured for July. The derived writhest libil extensions is in last agreement with swelleble date in the libil extension in the libil experience of collision excels in which some is not geographical cloud distributions may presented. The integration are parlomed for 60 days with a CFL rodel sed that hear 30 days are analysed.

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Particles and Fields-Interplanetary Space

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Delence Research Establishment and which is one of the groups active in the applications of particle beams to apace research. The program committee conelsted of B. N. Maehlum, C. Beghin, W. Bernstein, A. Johnstone, and J. R. Winckler. The subject matter was divided into major topics, with one or more 40-minute aummary papers in each erea. grouped as follows: accelerator experiments in epace, ac-

the lirst of a new series known as NATO Advanced Reeearch institutes. The session formal sc the recent Chapman conterencea held at Yosemtle Nationel Park. Sessions were held each moming, Tuesday Ihrough Saturday, end aller a lunch end recrestional break, continued in the elternoon end early evening, up to dinner hour. The altendance was limited to about 65 persons, who were encouraged to alay together for the entire conference period. The unique character of the meeting was the result of current intereal in this very specialized topic, the internalional allondance, and the excellent accommodelions at the Veslilia Hayfjellahalell. The conlereea assembled in Oslo and traveled together by train on Monday, April 20, arriving at Gello in about 4 hours. The fact that most participants remained for the entirs week end the lact thei the rather relaxed pace of the meeting gave ample time for discussion and interchange of idees contributed much to its auccess. The conference was organized by the Norwegian group which was headed by Seini N. Meehlum of the Norweglan

celerator experiments in laboratory, the theory of beam plasma interactione, naturel beam plasme phenomena in near epace, the neutralization of charged bodies in a plasma, and a finel sesaion of luture plans, discussiona, and recommendations. Each subject area beside the summary talks included various contributed papera and e summary discussion organized by the session leader.

in recent years, particle accelerators carried by apace vehicles have provided a veluable supplement to passive clagnostic experiments in exploration of apace plasmas. Already, at least 30 large sounding rockets have carried acceleratora or other types of plasma injectore into the ionoaphere, and small electron or ion injectora have been used on orbiting vehicles. Much interest centers around the large accelerators to be carried by the space shuttle with accompanying plasma diagnostic instrumentation. The central interest of the conference wee lihe interaction of a particle beam with a background plasma. The beam plasma interection is one of the oldest known phenomena in plasma physics and dates beck to the work of Irving Langmuir. In the '50'a and '60's the subject was studied by Bernstein (Ira), by Bohm and Groes, and by Vlasov and Landau In the USSR. When it was proposed to inject particle beams from epace vshicles, there was much concern that plasma waves would diesipate the beam energy catastrophically and rapidly thermalize the beam particles. Although a complately catastrophic beam loss does not assem to occur in practice, nevertheless etrong interactions have been observed.

Plaeme and wave diagnostics were widely discussed from measuremente made in very large vacuum facilitias in Japan, in Europe and in the Johnson Space Center, USA, aa well as from spaca vehicles. A particularly definitive experiment was reported by the Stenzel group at UCLA and was a very carefully scaled measurement of the translend development of the basic beam plasma interaction in a region below the BPD (beam plaems discharge) ignition

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threshold. The experiment was conducted in a modarelealze laboratory chamber and demonstrated how plesme waves rapidly convert to ion acquelle and finelly to electromagnetic mode, which can then be observed at large distances from the source. Electromagnetic radiation has been observed at ground level during the injection of electron beams in Soviet 'Zamitza' experimente, during the Franco-Soviet 'ARAKS' launchinga, and during the U.S. 'ECHO' llights. Whistler mode and other wavea heve been observed in apaca near the beam-emitting vehicle and were actively discussed at Gello.

One of the most dramatic interactions is the BPD of ered by Smullen and Gelly In the U.S. and sludled by Karchenko and Fainberg and others in the USSR and by Bern etein (W.) and many others in the U.S. Numerous papers at the conference described recent laboratory studies of the BPD, using for example the glant vacuum fecilities el lha Johnson Space Center (now closed because of budgeler) problems) and a wida variety of instrumentation, including lelevision, wave and particle detectors, and plasma diagnostice. It is recognized that the apectacularly bright luminoelty which appears in the chamber experiments above a certain threshold has the same nature as the classic RF discharge in a neutral gae except that the intense fluctual ing electric fielde are generated by a collective mode insia. bility in the beam plaama interaction instead of by an exist nal RF source and that a aubetantial neutral population is needed for Ignition. An example of a beam-plasma discharge le ehown in the figure (aee cover).

A humber of papers analyzed rocket experiments for the presence of the BPD in the loncephere. Some cases seen quite certain; others are contradictory. Whisiler mode radis tion measured during beam injection in space strongly resembled that seen in the laboratory during BPD. However, space environment has no walla, and the scaling parame lers muet be adjuated on a different baala then the laboratory. Deeplie an extensive body of previous laboratory re-

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